Claims 9 and 29 require that portions of the patterned getter layer be "sufficiently narrow to prevent the patterned getter layer from cracking when the OLED device structure is flexed during normal service." The Office Action contends that the claims are indefinite because "there is no explanation ascertaining the degree of narrowness." Applicants respectfully traverse this rejection.

"The legal standard for indefiniteness is whether a claim reasonably apprises those of skill in the art of its scope." See, e.g., In re Warmerdam 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994). That standard has been met here--the degree of narrowness is simply that degree which is sufficient to prevent the patterned getter layer from cracking when the OLED device structure is flexed. In this connection, it is noted that substances that appear to be brittle (e.g., glass) can become quite flexible when their dimensions are made sufficiently narrow (e.g., flexible glass fibers).

Applicants are free to use either functional or structural claim limitations in their claims. See, e.g., In re Schreiber, 128 F.3d 1473, 44 USPQ2d 1429 (Fed. Cir. 1997). Moreover, claims are not rendered indefinite by the fact that some experimentation may be required to determine their scope. See, e.g., Exxon Research & Engineering Co. v. United States, 265 F.3d 1371, 60 USPQ2d 1272 (Fed. Cir. 2001); W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1557, 220 USPQ 303, 316 (Fed. Cir. 1983).

In view of the above, reconsideration and withdrawal of the rejection of claims 9-11 and 29-31 under 35 U.S.C. 112, second paragraph, are respectfully requested.

**2. Rejection of claims 1, 3-5, 7, 8, 16-18 and 21-24--35 U.S.C. 102(a)**

Claims 1, 3-5, 7, 8, 16-18 and 21-24 are rejected under 35 U.S.C. 102(e) as anticipated by U.S. Patent No. 6,383,664 to Bernius et al. The Applicants respectfully traverse this rejection and its supporting remarks.

Independent claim 1 is directed to an OLED device structure comprising: (a) a substrate; (b) an OLED display area comprising one or more active pixels disposed over the substrate, wherein each of the pixels comprises an anode region, a cathode region and a light-emitting region; (c) a cover over the OLED display area, wherein the cover permits transmission of light from the one or more active pixels to an outer environment, and wherein the cover and the substrate cooperate to restrict transmission of oxygen and

water vapor from the outer environment to the OLED display area; and (d) a patterned getter layer disposed between the substrate and the cover. The patterned getter layer is configured so as to substantially avoid obstructing the transmission of the light that is permitted by the cover from the one or more pixels to the outer environment.

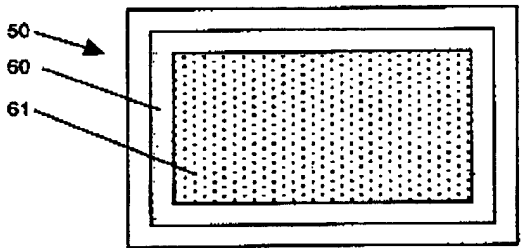
Similarly, independent claim 21 is directed to an organic optoelectronic device structure comprising: (a) a substrate; (b) an organic optoelectronic device selected from an organic phototransistor, an organic photodetector, and an organic photovoltaic device disposed over the substrate; (c) a cover over the organic optoelectronic device, wherein the cover permits transmission of light between an outer environment and the organic optoelectronic device, and wherein the cover and the substrate cooperate to restrict transmission of oxygen and water vapor from the outer environment to the organic optoelectronic device; and (d) a patterned getter layer disposed between the substrate and the cover. The patterned getter layer is configured so as to substantially avoid obstructing the transmission of the light that is permitted by the cover between the outer environment and the organic optoelectronic device.

Independent claim 17 is directed to a method of making an OLED device structure comprising: (a) providing a substrate; (b) forming an OLED display area over the substrate, the OLED display area comprising one or more active pixels, wherein each of the one or more active pixels comprises an anode region, a cathode region and a light-emitting region; (c) providing a cover over the OLED display area, wherein the cover permits transmission of light from the one or more active pixels to an outer environment, and wherein the cover and the substrate cooperate to restrict transmission of oxygen and water vapor from the outer environment to the OLED display area; and (d) providing a patterned getter layer between the substrate and the cover. The patterned getter layer is configured so as to substantially avoid obstructing the transmission of the light from the one or more pixels to the outer environment that is permitted by the cover.

"To anticipate, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim." *Brown v. 3M*, 265 F.3d 1349, 60 USPQ2d 1375 (Fed. Cir. 2001). Applicants respectfully submit that Bernius et al. fails to meet these criteria.

For example, unlike the cover of independent claims 1, 17 and 21, the cover in Bernius et al. does not necessarily permit transmission of light, as it can be formed from a variety of opaque materials, including aluminum and stainless steel. Col. 5, lines 11-14. Bernius et al. indicates that the lid should be fabricated from a rigid material with high barrier properties to oxygen and moisture. *Id.* The lid is rigid so as to maintain a gap between the cover 2 and the top surface of the optoelectronic element 2, which is established by the rim 60. See Fig. 3 and discussion at col. 4, line 62 to col. 5, line 10.

Moreover, the getter is not patterned as claimed in the above independent claims. The Office Action contends that Bernius et al. disclose at col. 6, lines 34-36 a patterned getter layer than surrounds the display area in the form of a ring. Applicants respectfully disagree. What Bernius et al. actually describes is a cover 50 having a raised rim 60, which defines a shallow cavity 61, onto which a film of reactive metal (depicted by dots) is deposited.




See also, col. 5, line 64 to col. 6, line 1 (emphasis added): "In one preferred embodiment, *the inner surface of the lid is coated* with a thin film of reactive metal which serves as a sacrificial 'getter' of traces of moisture, oxygen, and other potential harmful contaminants trapped inside the sealed cavity." Note that, because the cover in Bernius et al. need not permit transmission of light, such full coverage is advantageous.

Thus, independent claims 1, 17 and 21 are patentable over Bernius et al., at least because Bernius et al. does not teach or suggest a patterned getter layer, which is disposed between a substrate and a cover, and which is configured so as to substantially avoid obstructing light transmission that is permitted by the cover between the organic device and the outer environment.

Moreover, claims 3-5, 7, 8, 16, 18, 22, 23 and 24, which are dependent upon independent claims 1, 17 and 21, are neither taught nor suggested by Bernius et al. for at least the above reasons as well.

Therefore, reconsideration and withdrawal of the rejection of claims 1, 3-5, 7, 8, 16-18 and 21-24 under 35 U.S.C. 102(e) as being anticipated by Bernius et al. are respectfully requested.

**3. Claims 2, 12-15, 19 and 20—35 U.S.C. 103(a)**

Claims 2, 12-15, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. in view of U.S. Pat. No. 6,465,953 to Duggal. The Applicants respectfully traverse this rejection and its supporting remarks.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. 103, (a) there must be some suggestion or motivation to modify/combine the references of record, and (b) there must be a reasonable expectation of success. See MPEP §2143. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *Id.* The mere fact that references *can* be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination or modification. MPEP 2143.01 (emphasis added) (citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)).

As noted above, independent claims 1, 17 and 21 are patentable over Bernius et al., at least because Bernius et al. does not teach or suggest a patterned getter layer, which is disposed between a substrate and a cover, and which is configured so as to substantially avoid obstructing light transmission that is permitted by the cover between an organic device and an outer environment.

Duggal does not make up for the above deficiencies in Bernius et al. For example, see col. 3, lines 18-27 of Duggal:

> Plastic substrates for a device sensitive to water and/or oxygen, such as an organic light emitting device, with increased resistance to water and/or oxygen are disclosed. *The plastic substrates comprise a transparent or substantially transparent polymer filled with particles of a getter material* having a particle size which is smaller than the characteristic wavelength of light emitted by the organic light emitting device, and thus

> small enough so as to maintain the substantial transparency of the substrate, generally but not necessarily having a size of less than 100 nanometers (nm).

See also col. 7, lines 45 *et seq.* of Duggal. Hence, in contrast to the invention as presently claimed in independent claims 1, 17 and 21, Duggal doe not teach or suggest (a) a *patterned* getter *layer*, which is (b) disposed *between* a substrate and a cover. Instead, Duggal teaches (a) getter *particles*, which are (b) disposed *within* a substrate layer.

For at least these reasons, it is respectfully submitted that one of ordinary skill in the art, upon reading Bernius et al. in combination with Duggal, would not have found it obvious to modify/combine these references so as to provide a patterned getter layer, which is disposed between a substrate and a cover, and which is configured so as to substantially avoid obstructing light transmission that is permitted by the cover between an organic device and an outer environment, as claimed in claims 1, 17 and 21.

Because they depend from claim 1 or claim 17, it is respectfully submitted that claims 2, 12-15, 19 and 20 are likewise patentable over Bernius et al. in view of Duggal for at least the above reasons.

Accordingly, reconsideration and withdrawal of the rejection of claims 2, 12-15, 19 and 20 under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. in view of Duggal are respectfully requested.

**4. Claims 6 and 25--35 U.S.C. 103(a)**

Claims 6 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. in view of U.S. Pat. No. 5,931,713 to Watkins et al. The Applicants respectfully traverse this rejection and its supporting remarks.

As noted above, independent claims 1 and 21 are patentable over Bernius et al., at least because Bernius et al. does not teach or suggest a patterned getter layer, which is disposed between a substrate and a cover, and which is configured so as to substantially avoid obstructing light transmission that is permitted by the cover between an organic device and an outer environment.

Watkins et al., which the Office Action proposes combining with Bernius, is taken from art that far removed from the organic optoelectronic device art. For example, the devices of Watkins et al. are field emission displays, which are vacuum-sealed devices in which electrons are emitted from a cathode, striking a phosphor coated anode, whereupon light is produced. See, e.g., col. 1, lines 6-17. The devices of the present invention, on the other hand are organic optoelectronic devices, which are not vacuum devices, and which are not based on electron emission.

Moreover, Watkins et al. teaches that the getter should be placed in the space between the anode and cathode, and thus is integral with the active region of the device. See, e.g., col. 1, lines 29-31. On the other hand, in the device of Bernius et al., the getter is placed on the cover. See, e.g., col. 5, lines 64-66 and col. 6, lines 34-36. Thus, in contrast to the device of Watkins et al., the getter region in the device of Bernius et al. is *not* provided in the active region of the device between the anode and cathode. Indeed, if one were to place the metallic getters of Watkins et al. (or of Bernius et al.) between the anode and cathode of an OLED or organic optoelectronic device, harmful consequences would follow.

For at least these reasons it is respectfully submitted one of ordinary skill in the art, upon reading Bernius et al. in combination with Watkins et al., would not have found it obvious to modify/combine these references to provide the invention as presently claimed in claims 1 and 21.

At least because they depend from either claim 1 or claim 21, it is respectfully submitted that claims 6 and 25 are likewise patentable over Bernius et al. in view of Watkins et al.

Accordingly, reconsideration and withdrawal of the rejection of claims 6 and 25 under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. in view of Watkins et al. are respectfully requested.

**5. Claims 9-11 –35 U.S.C. 103(a)**

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. The Applicants respectfully traverse this rejection and its supporting remarks.

As noted above, independent claim 1 is patentable over Bernius et al., at least in that Bernius et al. does not teach or suggest a patterned getter layer, which is disposed between a substrate and a cover, and which is configured so as to substantially avoid obstructing light transmission that is permitted by the cover between an organic device and an outer environment. At least because they depend from claim 1, claims 9-11 are likewise patentable over Bernius et al.

Moreover, in addition to not teaching or suggesting a patterned getter layer as claimed, it is further submitted that Bernius et al. teaches that the cover should be rigid and hence resistant to flexing during handling. Hence, it is respectfully submitted that claims 9-12, which are directed to OLED device structures in which portions of the patterned getter layer are sufficiently narrow (see, for example, the narrow bands of claim 10 and the small dots of claim 11) to prevent the patterned getter layer from cracking when the OLED device structure is flexed during normal service, are unobvious in view of Bernius et al. for this reason as well.

Accordingly, reconsideration and withdrawal of the rejection of claims 9-11 under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. are respectfully requested.

**6. Claims 26 and 28-31 --35 U.S.C. 103(a)**

Claims 26 and 28-31are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. in view of Duggal. The Applicants respectfully traverse this rejection and its supporting remarks.

Claim 26 is directed to a flexible OLED device structure comprising: (a) a flexible substrate; (b) a flexible OLED display area comprising a plurality of active pixels disposed over the substrate, each of the plurality of active pixels comprising an anode region, a cathode region and a light-emitting region; (c) a flexible cover over the OLED display area, wherein at least one of the flexible substrate and the flexible cover permits transmission of light from the plurality of active pixels to an outer environment, and wherein the flexible cover and the flexible substrate cooperate to restrict transmission of oxygen and water vapor from the outer environment to the OLED display area; and (d) a patterned getter layer disposed between the flexible substrate and the flexible cover,

wherein at least a portion of the patterned getter layer is provided over non-emitting regions of the OLED display area between at least some of the plurality of pixels.

As noted above, Bernius et al. describes a rigid cover having a raised rim, which defines a shallow cavity, onto which a film of getter material is deposited. Hence, Bernius et al. does not teach or suggest a patterned getter layer. Moreover, Bernius et al. does not teach or suggest a flexible OLED device, and indeed, teaches away from such a device by requiring the use of a rigid cover.

Duggal does not make up for the above deficiencies in Bernius et al., for example, because Duggal neither teaches nor suggests (a) a *patterned* getter *layer* that is (b) disposed *between* a substrate and a cover. Instead, Duggal teaches (a) getter *particles* that are (b) disposed *within* a substrate layer.

For at least these reasons it is respectfully submitted one of ordinary skill in the art, upon reading Bernius et al. in combination with Duggal, would not have found it obvious to modify/combine these references to provide the invention as claimed in claim 26.

At least because they depend from claim 26, it is respectfully submitted that claims 28-31 are likewise patentable over Bernius et al. in view of Duggal.

Accordingly, reconsideration and withdrawal of the rejection of claims 26 and 28-31 under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. in view of either Duggal are respectfully requested.

**7. Claim 27 --35 U.S.C. 103(a)**

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernius et al. in view of Duggal and further in view of U.S. Patent No. 6,146,225 to Sheats et al. The Applicants respectfully traverse this rejection and its supporting remarks.

As noted above, claim 26 is patentable over Bernius et al. in view of Duggal. Sheats, which is directed to transparent, flexible permeability barriers, does not make up for the above noted deficiencies in Bernius et al. and Duggal. For at least this reason, claim 26 is patentable over Bernius et al., Duggal and Sheats et al.

At least because it depends from claim 26, it is respectfully submitted that claim 27 is likewise patentable over Bernius et al., Duggal and Sheats et al.

Accordingly, reconsideration and withdrawal of the rejection of claim 27 under 35 U.S.C. 103(a) as being unpatentable over Bernius et al., Duggal and Sheats et al. are respectfully requested.

**8. Claim 32--35 U.S.C. 103(a)**

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernius et al., Duggal and Watkins et al. The Applicants respectfully traverse this rejection and its supporting remarks.

As noted above, claim 26 is patentable over Bernius et al. in view of Duggal. Watkins et al. does not overcome the above noted deficiencies in Bernius et al. and Duggal. For example, as noted above, the getter in Watkins et al. is placed in the space between the anode and cathode, and thus is integral with the active region of the device. On the other hand, in the device of Bernius et al., the getter is placed on the cover, while in the device of Duggal it is placed within the substrate. Thus, in contrast to the device of Watkins et al., the getter regions in the devices of Bernius et al. and Duggal are *not* provided in the active region of the device between the anode and cathode. Indeed, if one were to place the metal and metal oxide getters of Watkins et al., Bernius et al. or Duggal between the anode and cathode of an OLED device, then harmful consequences would follow. For at least this reason, it is respectfully submitted that claim 26 is patentable over Bernius et al., Duggal and Watkins et al.

At least because it depends from claim 26, claim 32 is likewise patentable over Bernius et al., Duggal and Watkins et al.

Accordingly, reconsideration and withdrawal of the rejection of claim 32 under 35 U.S.C. 103(a) as being unpatentable over Bernius et al., Duggal and Watkins et al. are respectfully requested.

**CONCLUSION**

Applicants submit that claims 1-32 are in a condition for allowance, early notification of which is earnestly solicited. The Examiner is encouraged to telephone the Applicant's attorney at (703) 433-0510 in order that any outstanding issues be resolved.

Respectfully submitted,

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David B. Bonham
(Printed Name of Person Mailing Correspondence)

(Signature)

**Version With Markings To Show Changes Made**

**IN THE CLAIMS:**

1. (Amended) An OLED device structure comprising:

a substrate;

an OLED display area comprising one or more active pixels disposed over said substrate, each of said one or more active pixels comprising an anode region, a cathode region and a light-emitting region;

a cover over said OLED display area, wherein said cover permits transmission of light from said one or more active pixels to an outer environment, and wherein said cover and said substrate cooperate to restrict transmission of oxygen and water vapor from said outer environment to said OLED display area; and

a patterned getter layer disposed between said substrate and said cover, said patterned getter layer being configured so as to substantially avoid obstructing said transmission of light that is permitted by said cover from said one or more pixels to said outer environment.

2. The OLED device structure of claim 1, wherein said patterned getter layer is provided on said substrate.

3. The OLED device structure of claim 1, wherein said patterned getter layer is provided on said cover.

4. The OLED device structure of claim 1, wherein said patterned getter layer is provided at a position that is laterally beyond said OLED display area.

5. The OLED device structure of claim 4, wherein said patterned getter layer is provided in the form of a ring that laterally surrounds said OLED display area.

6. The OLED device structure of claim 1, wherein said OLED display area comprises a plurality of said active pixels, and wherein at least a portion of said patterned getter layer is provided over non-emitting regions of said OLED display area between at least some of said plurality of pixels.

7. The OLED device structure of claim 1, wherein said patterned getter layer comprises at least one material selected from Group IIA metals and Group IIA metal oxides.

8. The OLED device structure of claim 1, wherein said patterned getter layer comprises at least one material selected from calcium metal, barium metal, calcium oxide and barium oxide.

9. The OLED device structure of claim 1, wherein portions of said patterned getter layer are sufficiently narrow to prevent said patterned getter layer from cracking when said OLED device structure is flexed during normal service.

10. The OLED device structure of claim 9, wherein said patterned getter layer comprises a plurality of narrow bands of getter material.

11. The OLED device structure of claim 9, wherein said patterned getter layer comprises a plurality of small dots of getter material.

12. The OLED device structure of claim 1, wherein said light emitting region comprises a hole transporting layer, an emission layer and an electron transporting layer.

13. The OLED device structure of claim 1, wherein said substrate, said anode region and said cathode region each permits transmission of light between said light-emitting region and said outer environment.

14. (Amended) The OLED device structure of claim 1, [wherein said substrate is opaque,] wherein said anode region is disposed under said light-emitting region, and wherein said cathode is disposed over said light-emitting region and permits transmission of light between said light-emitting region and said outer environment.

15. (Amended) The OLED device structure of claim 1, [wherein said substrate is opaque,] wherein said cathode region is disposed under said light-emitting region, and wherein said anode is disposed over said light-emitting region and permits transmission of light between said light-emitting region and said outer environment.

16. The OLED device structure of claim 1, further comprising a sealing region disposed between said substrate and said cover, said sealing region cooperating with said substrate and said cover to enclose said OLED display area and restrict transmission of water and oxygen from an outer environment to said OLED display area.

17. (Amended) A method of making an OLED device structure comprising:

providing a substrate;

forming an OLED display area over said substrate, said OLED display area comprising one or more active pixels, each of said one or more active pixels comprising an anode region, a cathode region and a light-emitting region;

providing a cover over said OLED display area, wherein said cover permits transmission of light from said one or more active pixels to an outer environment, and wherein said cover and said substrate cooperate to restrict transmission of oxygen and water vapor from said outer environment to said OLED display area; and

providing a patterned getter layer between said substrate and said cover, said patterned getter layer being configured so as to substantially avoid obstructing said transmission of light that is permitted by said cover from said one or more pixels to said outer environment.

18. The method of claim 17, wherein said patterned getter layer comprises a

metal, and wherein said patterned getter layer is provided by vacuum deposition through a masking layer.

19. The method of claim 17, wherein said patterned getter layer comprises a metal oxide, and wherein said patterned getter layer is provided by applying a getter material in the form of a paste.

20. The method of claim 19, wherein said paste is applied by a technique selected from screen-printing and extrusion.

21. (Amended) An organic optoelectronic device structure comprising:

a substrate;

an organic optoelectronic device selected from an organic phototransistor, an organic photodetector, and an organic photovoltaic device disposed over said substrate;

a cover over said organic optoelectronic device, wherein said cover permits transmission of light between an outer environment and said organic optoelectronic device, and wherein said cover and said substrate cooperate to restrict transmission of oxygen and water vapor from said outer environment to said organic optoelectronic device; and

a patterned getter layer disposed between said substrate and said cover, said patterned getter layer being configured so as to substantially avoid obstructing said transmission of light <u>that is permitted by said cover</u> between said outer environment <u>and</u> [to] said organic optoelectronic device.

22. The organic optoelectronic device structure of claim 21, which is an organic phototransistor device structure.

23. The organic optoelectronic device structure of claim 21, which is an organic photodetector device structure.

24. The organic optoelectronic device structure of claim 21, which is an organic photovoltaic device structure.

25. The organic optoelectronic device structure of claim 21, wherein an array of said organic optoelectronic devices is provided, and wherein at least a portion of said patterned getter layer is provided between said organic optoelectronic devices within said array.

26. A flexible OLED device structure comprising:

a flexible substrate;

a flexible OLED display area comprising a plurality of active pixels disposed over said substrate, each of said plurality of active pixels comprising an anode region, a cathode region and a light-emitting region;

a flexible cover over said OLED display area, wherein at least one of said flexible substrate and said flexible cover permits transmission of light from said plurality of active pixels to an outer environment, and wherein said flexible cover and said flexible substrate cooperate to restrict transmission of oxygen and water vapor from said outer environment to said OLED display area; and

a patterned getter layer disposed between said flexible substrate and said flexible cover, wherein at least a portion of said patterned getter layer is provided over non-emitting regions of said OLED display area between at least some of said plurality of pixels.

27. The flexible OLED device structure of claim 26, wherein at least one of said flexible substrate and said flexible cover comprises a composite barrier region, said composite barrier region further comprising two or more planarizing layers and two or more high-density layers.

28. The flexible OLED device structure of claim 26, wherein said patterned getter layer comprises at least one material selected from Group IIA metals and Group IIA metal oxides.

29. The flexible OLED device structure of claim 26, wherein portions of said patterned getter layer are sufficiently narrow to prevent said patterned getter layer from cracking when said OLED device structure is flexed during normal service.

30. The flexible OLED device structure of claim 29, wherein said patterned getter layer comprises a plurality of narrow bands of getter material.

31. The flexible OLED device structure of claim 29, wherein said patterned getter layer comprises a plurality of small dots of getter material.

32. The flexible OLED device structure of claim 26, wherein a portion of said patterned getter layer is provided adjacent to each of said plurality of pixels.